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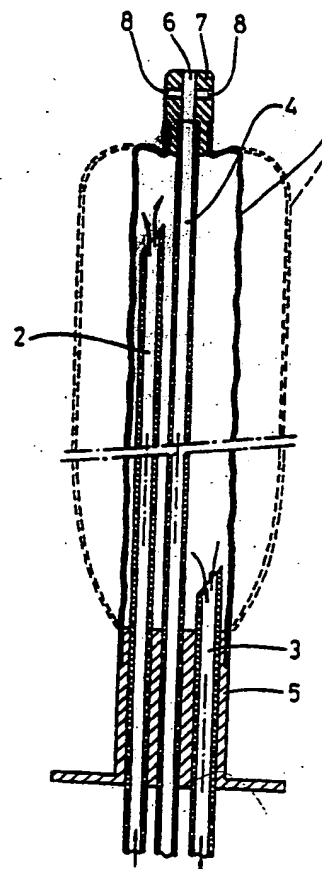
(21) International Application Number: **PCT/NL89/00078**(22) International Filing Date: **19 October 1989 (19.10.89)**(71) Applicant (for all designated States except US): **GRANU-LAB B.V. [NL/NL]; Klepelhoek 11, NL-3833 GZ Leusden (NL).**

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(75) Inventor/Applicant (for US only): **VAN LIEBERGEN, Anthonius, Josephus [NL/NL]; Beemden 22, NL-3831 GM Leusden (NL).**(74) Agents: **DE BRUIJN, Leendert, C. et al.; Nederlandsch Octrooibureau, Scheveningseweg 82, P.O. Box 29720, NL-2502 LS The Hague (NL).**(81) Designated States: **AT (European patent), BE (European patent), CH (European patent), DE (European patent)*, DK, FI, FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), NO, SE (European patent), SU, US.****Published***With international search report.**In English translation (filed in Dutch).*(54) Title: **DEVICE FOR COOLING OR HEATING A PERSON**

(57) Abstract

Device for cooling or heating a person with a circulation circuit for a cooling or heating fluid, wherein a closed elastically tube-like enclosure (1) is used. This can be introduced in a body cavity and a feed (2) and discharge (3) conduit open into the enclosure (1) for the cooling or heating fluid. The enclosure (1) is expandable by the fluid through pressure until it is in contact with the wall of the body cavity.



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DEVICE FOR COOLING OR HEATING A PERSON

5 The invention relates to a device for cooling or heating of a person comprising a circulation circuit for a cooling or heating fluid.

Such a device is e.g. used for heating or cooling of a patient. A known device comprises a mattress, through which the cooling or heating fluid is circulated.

10 This known device has the drawback that a relatively long time is necessary to cool or heat the patient, because the mattress cools or heats the skin of the patient and the inner temperature of the patient only slowly decreases or increases.

The inventions aims to provide a device of this kind not having this drawback.

15 To this end the device according to the invention is characterized by a closed elastic enclosure, which can be introduced in a body cavity, such as the oesophagus, in which enclosure a feed and discharge conduit for cooling or heating fluid open and which can be expanded up to contact against the wall of the body cavity.

20 In the expanded position of the device it substantially contacts the wall of the body cavity such as oesophagus. So the cooling or heating fluid circulating in the enclosure can directly centrally heat or cool the related person. Because of this heating or cooling occurs much faster.

25 In a preferred embodiment of the device according to the invention the feed conduit or discharge conduit opens near the one extremity of the enclosure, whilst the discharge conduit, the feed conduit respectively opens near the other extremity of the enclosure. In this way it is guaranteed that circulating, cooling or
30 heating fluid flows substantially through all over the enclosure, such that all over this enclosure an optimum cooling or heating effect is obtained.

Furthermore it is favourable if according to another preferred embodiment of the device according to the invention a further
35 tube-like conduit extends through the enclosure and penetrates this at both extremities, said conduit opening near the front extremity

of the enclosure outside of the enclosure. With this further tube-like conduit it is possible, if the device is introduced in the stomach of the person to be treated, to externally gain excess through the stomach, e.g. for suctioning of its contents or for realizing flushing of the stomach. The functioning of the enclosure is not affected by this further tube-like conduit, because it does not open into this enclosure but only extends therethrough.

To obviate attaching of the extremity of this further tube-like conduit by sunctioning according to a further embodiment of the device it is realized that on a short spacing, behind the opening in the conduit wall a number of radial directed ports are provided. Because of this an open connection between the internals of the tube-like conduit and its surrounding is provided.

To be able to check introduction of the device according to the invention in a body cavity it is preferred that this device is provided with equally lengthwise spaced markings such as silver points or the like being visible on X-ray images.

The invention is further elucidated referring to the drawing in which two embodiments of the device according to the invention are shown.

Fig. 1 shows a longitudinal section through a first embodiment of the device according to the invention, and

fig. 2 shows a partial longitudinal section on larger scale of a second embodiment of the device according to the invention.

The device shown in fig. 1 for cooling or heating of a person comprises a closed elastic tube-like enclosure 1, in which a feed conduit 2 and a discharge conduit 3 for a cooling or heating fluid open. The feed conduit 2 opens near the front extremity of the enclosure 1, whilst the discharge conduit 3 opens near the rear extremity of the enclosure.

Furthermore it is clear that through the enclosure 1 a further tube-like conduit 4 extends, opening near the front extremity of the enclosure outside of this enclosure 1. This conduit 4 does not communicate with the internals of enclosure 1. The rear extremity of the enclosure 1 opposite to the front extremity is connected to and closed by a mouth piece 5 which can be introduced in the mouth of the person to be treated and comprises rubber or the like.

Feed conduit 2, discharge conduit 3 and conduit 4 extend through this mouthpiece 5. Mouth piece 5 is sealingly connected to enclosure 1 as well as to the said conduits 2-4. In that the enclosure 1 sealingly connects at its front extremity to the tube-like conduit 4 inside of this enclosure a delimited space is provided, being only accessible through feed conduit 2 and discharge conduit 3. The conduit 4 is provided at its opening 6 with a enlarged plastic tip 7. Within a short spacing behind opening 6 in the wall of this tip 7 a number of radial directed ports is provided, which communicate at one extremity with the surroundings and with the other extremity communicate with the internals of conduit 4.

If the device has to be introduced in a body cavity, such as the oesophagus, the enclosure is in a non-expanded position, e.g. as shown in the position in Fig. 1 indicated with solid lines. After the desired position of the device is obtained the cooling or heating fluid is introduced in the enclosure 1 through feed conduit 2 whilst the discharge conduit 3 is as yet closed. Because of this the enclosure 1 will expand and e.g. obtain the position shown in dashed lines. In this expanded position of the enclosure it has substantial contact with the wall of the body cavity. After this the discharge conduit 3 is opened such that the cooling or heating fluid circulates through enclosure 1. After terminating of the treatment the feed through feed conduit 2 can be stopped and the cooling or heating fluid can be completely discharged from the enclosure 1 through discharge conduit 3. Because of this enclosure 1 retracts and the device can be taken from the body cavity.

With conduit 4 it is possible to evacuate the stomach of a person to be treated during treatment. The functioning of the conduit 4 does not have any influence on the functioning of enclosure 1. The radial directed holes 8 prevent attachment of the opening 6 of the conduit to e.g. the wall of the stomach.

The connection of the enclosure to the tip 7 and to the mouth piece 5 is generally such that between the enclosure and the tip 7 and the mouthpiece 5 no sharp transitions occur.

The mouthpiece 5 functions specifically to prevent that the enclosure 1, normally comprising of latex material, is damaged, whilst it is prevented that the enclosure expands near the mouth.

In the embodiment, shown in Fig. 1, conduits 2-4 are side by side. However, it is also possible more particular to embody feed conduit 2 and tube-like conduit 4 concentrically. This is shown in fig. 2. For maintaining the relative position of the feed conduit 2 and the conduit 4 it is possible that they have been embodied integrally, e.g. in that between the inner wall of the feed conduit 2 and the outer wall of conduit 4 spaced rib-like elements (not shown) have been provided.

To be able to check the insertion of the device in a body cavity it is possible that on uniform spacings in length direction marking points are provided, being visible on a X-ray image. Such marking points can e.g. comprise silver.

The device described above comprises an oesophagus hypo-hyper thermal device, with which the center temperatures of patents can be effectively changed. Furthermore it is possible to improve healing of wound or an operation wound with this device. If the device is introduced in the oesophagus it can be useful in keeping this oesophagus opened.

The use of the device according to the invention obviates in several cases surgical treatment. Inserting of catheters and blood lines for controlling of the central temperature of a patient becomes superfluous.

The invention is not restricted to the embodiments described above which can be varried within the scope of the invention in several ways.

C l a i m s

1. Device for cooling or heating of a person, having a circulating circuit for a cooling or heating fluid, characterized by a closed elastic tube-like enclosure, which can be positioned in a body cavity, such as oesophagus, in said enclosure a feed end discharge conduit for the cooling or heating fluid open and which can be expanded by this fluidum under pressure up to contact against the wall of the body cavity.
2. Device according to claim 1, characterized in that the enclosure is produced from latex.
3. Device according to claim 1 or 2, characterized in that the feed conduit or discharge conduit opens near the one extremity of the enclosure, whilst the discharge conduit, feed conduit respectively opens near the other extremity of the enclosure.
4. Device according to the claims 1-3, characterized in that, the rear extremity of the enclosure is connected to and is closed by a piece from rubber or the like which can be inserted in the mouth of the patient to be treated, the feed and discharge conduit extending through this mouthpiece.
5. Device according to one of the claims 1-4, characterized in that a further tube-like conduit extends through the enclosure and penetrates at its both extremities, said conduit opening near the front extremity of the enclosure outside of this enclosure.
6. Device according to claim 5, characterized in that the conduit near its opening is provided with an enlarged plastic tip.
7. Device according to claim 5 or 6, characterized in that with a short spacing behind the opening of the conduit wall a number of radially directed ports is provided.
8. Device according to one of the claims 5-7, characterized in that the tube-like conduit and the feed and discharge conduit respectively opening near the front extremity of the enclosure extend concentrically.
9. Device according to claim 8, characterized in that a tube-like conduit and the related feed and discharge conduit respectively are embodied integrally.
10. Device according to one of the claims 1-9, characterized

in that it is provided with mark points being uniformly distributed over its length and being visible on X-ray images, such as silver points or the like.

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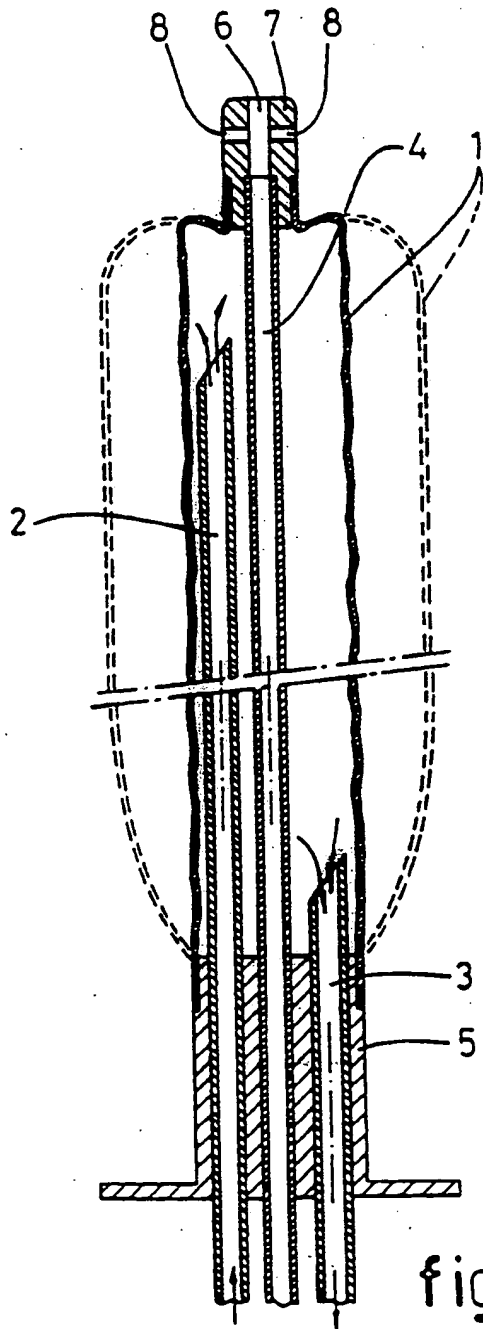


fig.1

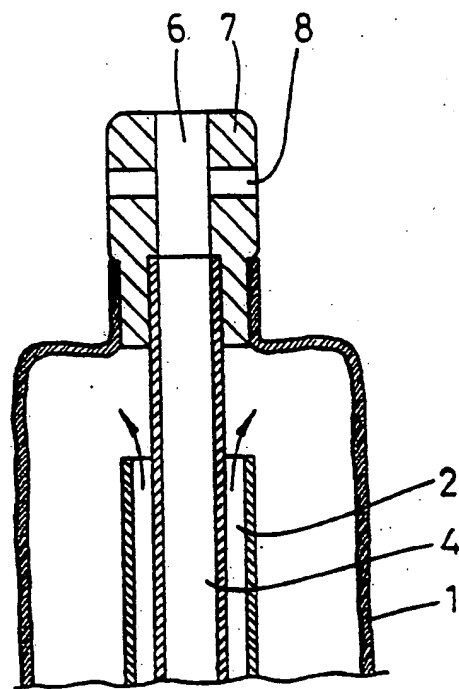


fig.2

INTERNATIONAL SEARCH REPORT

International Application No. PCT/NL 89/00078

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶ According to International Patent Classification (IPC) or to both National Classification and IPC IPC ⁵ : A 61 F 7/12																				
II. FIELDS SEARCHED <div style="text-align: right; font-size: small;">Minimum Documentation Searched ⁷</div> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;">Classification System</td> <td style="width: 50%; border: none;">Classification Symbols</td> </tr> <tr> <td style="border: none; padding-top: 10px;">IPC⁵</td> <td style="border: none; padding-top: 10px;">A 61 F</td> </tr> </table> <div style="text-align: center; font-size: x-small; margin-top: 10px;">Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched ⁸</div>			Classification System	Classification Symbols	IPC ⁵	A 61 F														
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III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹ <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th style="width: 10%;">Category ¹⁰</th> <th style="width: 60%;">Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²</th> <th style="width: 30%;">Relevant to Claim No. ¹³</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: top;">X</td> <td style="vertical-align: top;">GB, A, 658662 (REICH) 10 October 1951 see page 2, lines 25-49; figure 2 --</td> <td style="text-align: center; vertical-align: top;">1-3</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">X</td> <td style="vertical-align: top;">US, A, 3125096 (ANTILES) 17 March 1964 see column 2, line 8 - column 3, line 9; figures 1,2</td> <td style="text-align: center; vertical-align: top;">1,3,5,10</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td style="vertical-align: top;">--</td> <td style="text-align: center; vertical-align: top;">6-9</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">X</td> <td style="vertical-align: top;">US, A, 3848607 (ST. CLAIR) 19 November 1974 see column 2, lines 26-32; column 3, line 46 - column 4, line 26; column 4, line 56 - column 5, line 22; figures 1,4-6</td> <td style="text-align: center; vertical-align: top;">1,3,4</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td style="vertical-align: top;">--</td> <td style="text-align: center; vertical-align: top;">8,9</td> </tr> </tbody> </table>			Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	X	GB, A, 658662 (REICH) 10 October 1951 see page 2, lines 25-49; figure 2 --	1-3	X	US, A, 3125096 (ANTILES) 17 March 1964 see column 2, line 8 - column 3, line 9; figures 1,2	1,3,5,10	Y	--	6-9	X	US, A, 3848607 (ST. CLAIR) 19 November 1974 see column 2, lines 26-32; column 3, line 46 - column 4, line 26; column 4, line 56 - column 5, line 22; figures 1,4-6	1,3,4	Y	--	8,9
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Y	--	8,9																		
<div style="display: flex; justify-content: space-between; font-size: x-small;"> <div style="width: 45%;"> <p>¹⁴ Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"Z" document member of the same patent family</p> </div> </div>																				
IV. CERTIFICATION <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> Date of the Actual Completion of the International Search <div style="text-align: center;">1st June 1990</div> </td> <td style="width: 50%; padding: 5px;"> Date of Mailing of this International Search Report <div style="text-align: center;">29.06.90</div> </td> </tr> <tr> <td style="width: 50%; padding: 5px;"> International Searching Authority <div style="text-align: center;">EUROPEAN PATENT OFFICE</div> </td> <td style="width: 50%; padding: 5px;"> Signature of Authorized Officer <div style="display: flex; align-items: center;"> <div style="flex: 1; text-align: center;"> </div> <div style="flex: 1; text-align: center;"> H. DANIELS </div> </div> </td> </tr> </table>			Date of the Actual Completion of the International Search <div style="text-align: center;">1st June 1990</div>	Date of Mailing of this International Search Report <div style="text-align: center;">29.06.90</div>	International Searching Authority <div style="text-align: center;">EUROPEAN PATENT OFFICE</div>	Signature of Authorized Officer <div style="display: flex; align-items: center;"> <div style="flex: 1; text-align: center;"> </div> <div style="flex: 1; text-align: center;"> H. DANIELS </div> </div>														
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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, " with indication, where appropriate, of the relevant passages	Relevant to Claim No.
Y	US, E, 30365 (MATTTLER) 12 August 1980 see column 3, line 55 - column 4, line 14; figure 9 --	6,7
X	US, A, 3496942 (SHIPLEY) 24 February 1970 see column 3, lines 27-57; figures 1,3	1,3
A	 -----	4

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.

NL 8900078

SA 31792

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB-A- 658662		None	
US-A- 3125096		None	
US-A- 3848607	19-11-74	CA-A- 1024029	10-01-78
		DE-A- 2251135	03-05-73
		FR-A- 2158002	08-06-73
		GB-A- 1336270	07-11-73
US-E- 30365	12-08-80	US-A- 3896816	29-07-75
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